

## CLAIMS

1. A functionality testing apparatus for an engine cylinder deactivation control and system having a plurality of solenoid-operated valves for controlling hydraulic actuation of switching valve lifters, said apparatus comprising:
  - 5 a portable test box enclosing an electrical circuit connectable to the deactivation control and having a ground lead for connection to the control ground, a solenoid lead for each cylinder and connectable to the solenoids of their respective cylinders, and external taps on the exterior of the box and connected one with each of the ground lead and the solenoid  
10 leads.
2. An apparatus as in claim 1 including a power light in the ground lead operative when grounded to indicate that the deactivation control is supplied with power.
3. An apparatus as in claim 1 including an injector lead for each cylinder and connectable with injector control valves of their respective cylinders.
4. An apparatus as in claim 3 and including a switch in each of the solenoid leads and selectably closable to connect the respective solenoid control leads to a ground line connectable to an external ground.
5. An apparatus as in claim 4 wherein each switch is also connectable in one of the injector leads and is operative to open the associated injector lead upon closing of the switch in the corresponding solenoid lead.

6. An apparatus as in claim 5 including a first harness connector connected with the ground lead, the solenoid leads and the injector leads for connecting these leads with a deactivation control wiring harness.

7. An apparatus as in claim 6 including a second harness connector connected with injector leads for connecting these leads to an engine wiring harness.

8. A method of using an apparatus as in claim 1 for testing functionality of an engine cylinder deactivation control, said method comprising:

- connecting the test box electrical circuit with an engine cylinder  
5 deactivation control;
- connecting the terminals of an ohmmeter between the ground lead tap and each of the solenoid lead taps sequentially and reading the resistances through each of the solenoid circuits in the control; and
- comparing each resistance reading with a predetermined range of  
10 values to determine if each solenoid circuit is within the predetermined range.

9. A method as in claim 8 including:

- with the ground lead ungrounded, connecting the common terminal of an ohmmeter between an engine ground and each of the solenoid lead taps sequentially and reading the resistance value for each cylinder  
5 solenoid circuit; and
- comparing each resistance reading with the readings for the other circuits or with a predetermined lower limit to determine if corrective action is required.

10. A method of using an apparatus as in claim 7 for testing functionality of an engine cylinder deactivation control, said method comprising:

- with the cylinder deactivation control installed on an engine,
- 5 connecting the first and second harness connectors to connectors of the deactivation control wiring harness and the engine wiring harness, respectively, and connecting the ground lead to a good engine ground;
- supplying ignition power to the engine;
- checking whether the power light is lighted with normal
- 10 brightness, indicating the deactivation control has power without excessive resistance in the power circuit, wherein a dim light indicates a high resistance circuit and failure to light indicates a lack of power supply.

11. A method of using an apparatus as in claim 7 for testing functionality of an engine cylinder deactivation control in an operating engine, said method comprising:

- prior to engine operation, connecting the first and second harness
- 5 connectors to connectors of the deactivation control wiring harness and the engine wiring harness, respectively, and connecting the ground lead to a good engine ground;
- operating the engine at constant speed and load conditions in which the torque produced by the engine is greater with at least one of the
- 10 cylinders deactivated than with all the cylinders activated; and
- deactivating each of the cylinders separately while maintaining engine speed and load and noting whether engine speed increases to a consistent higher speed with deactivation of each cylinder, wherein lack of a consistent speed increase indicates one or more problems in the operation of
- 15 the deactivation system of the deactivated cylinder which may be indicated by the resulting engine speed condition.